

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claims 1 - 42 cancelled.

1. A method of producing a parametric ultrasonic wave to be decoupled in air to create a decoupled audio wave that more closely corresponds to an audio input signal, the method comprising:

(a) ascertaining a linear response over a predefined frequency range of an acoustic output of an electro-acoustical emitter to be used for parametric ultrasonic output; and
(b) creating a parametric ultrasonic processed signal by adjusting linear parameters of at least one sideband frequency range of a parametric ultrasonic signal to compensate for the linear response of the acoustic output of the electro-acoustical emitter such that the content of the audio input signal and that of a decoupled audio wave more closely correspond.

2. A method in accordance with claim 1, wherein the linear response is a function of physical characteristics of the electro-acoustical emitter and the carrier frequency and the sound pressure level and environmental medium wherein the parametric ultrasonic wave is propagated.

3. A method in accordance with claim 1, wherein at least one linear parameter is selected from the group consisting of amplitude, directivity, time delay, and phase.

4. A method in accordance to claim 1, further comprising the step of providing an electro-acoustical emitter that includes an electrically sensitive and mechanically responsive (ESMR) film.

5. A method in accordance to claim 1, further comprising the step of pre-equalizing amplitudes of the parametric ultrasonic signal to compensate for a naturally occurring attenuation in amplitude of output waves over sideband frequency ranges on at least one side of a carrier signal frequency.

6. A method in accordance with claim 1, wherein the correction is an amplitude correction having a value between zero and one times the magnitude of the amplitude value to which the correction is applied.

7. A method of producing a parametric ultrasonic wave to be decoupled in air to create a decoupled audio wave that closely corresponds to an audio input signal, the method comprising:

- (a) ascertaining a linear response over a predefined frequency range of an acoustic output of an electro-acoustical emitter to be used for parametric ultrasonic output;
- (b) setting a target acoustic modulation index for the parametric ultrasonic wave to a predetermined value;
- (c) generating a parametric ultrasonic signal having an electrical modulation index that has been set at a higher level than the target acoustic modulation index to compensate for effects of the linear response of the electro-acoustical emitter; and
- (d) emitting the parametric ultrasonic signal from the electro-acoustical emitter, resulting in the parametric ultrasonic wave being propagated having the target acoustic modulation index at least at a predefined point in space.

8. A method in accordance with claim 7, comprising the more specific step of generating the parametric ultrasonic signal having an electrical modulation index greater than one, wherein the target acoustic modulation index is less than one.

9. A method in accordance with claim 7, comprising the more specific step of generating a parametric ultrasonic signal having a single sideband.

10. A method in accordance with claim 7, comprising the more specific step of generating a parametric ultrasonic signal having double sidebands.

11. A method in accordance with claim 7, wherein the linear response of the acoustic output is a function of physical characteristics of the electro-acoustical emitter, electrical signal

parameters and conditions in an environmental medium wherein the parametric ultrasonic wave is propagated.

12. The method according to claim 7, wherein the step of generating a parametric ultrasonic signal having an electrical modulation index that has been set at a higher level than the target acoustic modulation index includes (i) creating a parametric ultrasonic signal by modulating a carrier signal with an audio input signal and (ii) adjusting the electrical modulation index of the parametric ultrasonic signal.

13. The method according to claim 12, wherein the step of adjusting the electrical modulation index includes decreasing the amplitude of a carrier wave.

14. The method according to claim 12, wherein the step of adjusting the electrical modulation index includes adjusting the linear parameters of at least one sideband of the parametric ultrasonic signal.

15. The method according to claim 7, wherein the linear parameters are selected from the group consisting of amplitude, directivity, time delay, and phase.

16. The method according to claim 7, wherein the electro-acoustical emitter includes an electrically sensitive and mechanically responsive (ESMR) film emitter.

17. A method of producing a parametric ultrasonic wave to be decoupled in air to create a decoupled audio wave that closely corresponds to an audio input signal, the method comprising:

- (a) providing an electro-acoustical emitter to be used for parametric output, wherein a linear response of an acoustic output from the electro-acoustical emitter is known over a predefined frequency range;
- (b) providing the audio input signal and an ultrasonic carrier signal;

- (c) parametrically modulating the audio input signal with the ultrasonic carrier signal, wherein a parametric ultrasonic signal results, comprising:
 - (i) the ultrasonic carrier wave;
 - (ii) an upper sideband; and
 - (iii) a lower sideband;
- (d) creating a parametric ultrasonic processed signal by adjusting linear parameters of the parametric ultrasonic signal to compensate for effects of the linear response of the acoustic output from the electro-acoustical emitter; and
- (e) emitting the parametric ultrasonic processed signal using the electro-acoustical emitter, resulting in the parametric ultrasonic wave having a modulation index that closely approximates a modulation index of the electrical parametric signal at least at a predefined point in space over at least one sideband frequency range.

18. A method in accordance with claim 17, comprising the more specific step of adjusting the linear parameters of the carrier wave so that the modulation index of the parametric ultrasonic wave is optimized at the predefined point in space.

19. A method in accordance with claim 17, wherein the linear parameters are selected from the group consisting of amplitude, directivity, time delay, and phase.

20. A method in accordance with claim 17, comprising the more specific step of providing an electro-acoustical emitter comprised of an electrically sensitive and mechanically responsive (ESMR) film emitter.

21. A method for improving fidelity in parametric audio reproduction of content of an audio signal in an air medium, comprising:
determining a typical amplitude response over a selected frequency range including at least a portion of each of the upper and lower sideband frequency ranges of a parametric emitter of a selected design and selected parameter values, including at least one carrier frequency and at least one output sound pressure level;

determining any difference in sideband response over the upper and lower sideband frequency ranges;

determining any amplitude correction needed to account for any difference in sideband response over at least a portion of said frequency ranges within the selected frequency range for said emitter;

providing for applying any needed amplitude correction to a modulated ultrasonic carrier signal to be reproduced in an emitter of the selected design using said selected parameter values over at least a portion of at least one of the upper and lower sideband frequency ranges within the selected frequency range to correct for said difference in response of such emitter over the upper and lower sideband frequencies, giving lower distortion of the content of the audio signal when reproduced in an air medium.

22. A method in accordance with claim 21, wherein the step of providing for applying any needed amplitude correction further comprises the more specific step of applying a correction greater than zero and less than one times the magnitude of the amplitude value to which the correction is applied.

23. A method for improving the fidelity of parametric audio reproduction of content of an audio signal in an air medium, comprising the steps of:

Characterizing the sideband amplitude response of a parametric emitter applying a correction in generating a modulated carrier signal for parametric reproduction of said content which accounts for asymmetry in sideband response of said emitter.